

Records of Indiana Dragonflies, X. 1937-1940

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During the period 1937-1940 about 3930 specimens of Odonata representing 90 species were collected in Indiana; of these 266 specimens of 29 species were taken in 1937, 434 specimens of 50 species in 1938, 1455 specimens of 54 species in 1939 and 1796 specimens of 65 species in 1940. These collections included specimens of several rare species, some of them in considerable numbers, specimens of two species new to the state and others representing 187 new county records. All specimens are in the collection of the author, but duplicates will be distributed to private and institutional collections. All identifications have been made by the author.

Collecting during the last four years was carried on, as far as possible, in such a way as to contribute to a knowledge of the seasonal and geographical range and abundance of the species within the state. Data of these collections are given in two lists, one a list of the collections by localities and dates, the other a list of the species known from Indiana. In the list of collections the localities are arranged by counties and the species are recorded by the use of Williamson's (1917) numbers. In the list of species counties from which specimens of each were obtained in 1937-1940 are indicated. Notes on abundance, interesting observations, taxonomic notes based on specimens in the collections and other germane comments are included in both lists.

Collections for approximately the same date (half month or less) from the same collecting station, whether for one or more years, have been combined if there appeared to be no essential difference between them. Almost all of the collections were made by the author; those made by others have the name or initials of the collector(s) following the date. Collectors indicated by initials include A. W. Trippel (AWT), B. E. Heniford (BEH), B. Elwood Montgomery (BEM), Esther B. Montgomery (EBM), John J. Favinger (JJF), Lynn Robertson, Jr. (LR), Malcolm B. McDonald (MBM), Robert P. Mullett (RPM), and Virgil A. Knapp (VAK).

In the list of species, those species which have been discovered in the state since 1917 are interpolated into Williamson's list and the paper in which they were first recorded is indicated by author and date in parentheses following the species name. Species recorded from the state for the first time in this paper have the species number and name starred (*); new county records are also starred.

List of Collections made during 1937-1940

(Arranged by counties and collecting stations)

Adams. Near Decatur, June 8, 1937, (AWT), species: 43.

Allen. Along small stream near Leo, June 16, 1940, (VAK), species: 3, 58, 104, 112, 114.

Boone. Gravel pit near Sugar Creek, July 20, 1940, (EBM & BEM), species: 17, 20, 21, 22a, 29, 43; Oct. 6, 1940, species: 43.

Carroll. Lake Freeman, west of Patton, July 10, 1939, species: 3, 15, 18, 22a, 24, 29, 43, 87, 96, 99, 104, 107, 115. Tippecanoe River at Springboro Bridge, Sept. 3, 8 and 15, 1940, species: 4, 5, 15, 16, 17, 24, 25, 29, 34, 41, 43, 52, 62, 68, 70, 104, 107. The river at this point is a continuous series of ripples. At the time of the first and third visits the water was generally about one to three feet deep and many rocks were exposed; the second visit followed a rain and the water was somewhat muddy and deeper, covering many of the rocks. The gomphines were rather common on Sept. 3, flying over the ripples, alighting on exposed rocks, or, now and then, "hanging-up" in trees along the banks; on Sept. 8, they were much less common, but almost as many specimens were secured as on the earlier visit because they were found chiefly along the banks; at the time of the final visit they were quite rare, only one specimen (*E. designatus*) was taken and few others were seen. The number of individuals of the species of *Argia* and *Enallagma* decreased from one visit to the next, those of the latter more rapidly than those of the former. *Hetaerina americana* was very abundant each time but only one male of *H. titia* was seen (Sept. 3). Grassy, almost lawn-like bank of Tippecanoe River, below Oakdale Dam, Sept. 15, 1940, (LR, BEH, & BEM), species: 4, 11, 16, 17, 22a, 24, 25, 34, 41, 43.

Cass. Mud Creek, Sept. 12, 1937, species: 78—1 ♂ 1 ♀.

Clark. Francke Lake, June 10, 1940, June 15-16, 1938, species: 20, 21, 22, 22a, 33, 34, 41, 43, 44, 87, 89, 90, 96, 99, 107, 114, 115, 118; July 21-22, 1939, (EBM & BEM), species: 15, 17, 20, 25, 69, 85, 87, 96, 99, 100, 104, 105, 107, 115, 118, 119; Aug. 13, 1939, (LR, MBM & BEM), species: 15, 17, 20, 25, 41, 43, 69, 87, 96, 99, 100, 105, 107, 118. Schlamm Lake, June 10, 1940, June 14, 1937, June 14-16, 1938, June 20, 1937, species: 15, 22a, 25, 34, 43, 44, 87, 89, 90, 96, 99, 100, 104, 107, 115, 118, 124; July 22, 1939 (EBM & BEM), July 28, 1937, species: 22a, 34, 41, 43, 85, 87, 99, 104, 105, 114, 115, 118, 124; Aug. 2, 1938, Aug. 13, 1939, (LR, MBM & BEM), species: 41, 43, 69, 87, 99, 105. Stream below Schlamm Lake, June 20, 1937, species: 48—1 ♂. State Forest—roads and open glades near water course with no flow of water, but occasional pools, June 20, 1937, species: 96; July 27, 29, and Aug. 2, 1938, species: 94 (10 ♂ 8 ♀, 7 ♂ 7 ♀ and 1 ♂ 1 ♀ respectively on the three dates), 99.

Clay. Creek and pond near Cloverland, Aug. 28, 1939, (Robert Trueman), species: 5, 22a, 25, 34, 41, 43, 99, 105. Near Jasonville, Aug. 19, 1938, species: 96.

Elkhart. St. Joseph River, west of Bristol, May 22, 1938, (AWT), species: 37, 60, 64; June 29, 1939 (EBM & BEM), species: 3, 15, 16, 18, 29.

Fountain. Pond about two miles south of Attica, June 21, 1940, species: 3, 20, 25, 37a, 43, 72, 99, 100, 104, 107. This pond appears to fill an excavation made by the removal of marl and seems quite deep; it is almost surrounded by wooded hills and is fed by springs.

Franklin. Old canal, seven miles west of Brookville, Oct. 6, 1940, species: 25, 29 (1 ♂ each).

Fulton. Stream near Rochester, June 29, 1939, species: 3, 43, 104.

Gibson. Stream in wooded hills near Foote's Lake, July 14, 1939, species: 3. Foote's Lake, July 14, 1939, species: 15, 25, 41, 43, 63, 69, 80, 87, 100, 103, 104, 105; Aug. 19, 1940, (considerable wind; following several cool days) species: 11, 15, 34, 43, 104; Aug. 21, 1938, species: 69, 85, 104, 105, 107, 115; Aug. 31, 1938, species: 15; Sept. 7, 1939, species: 11, 15, 25, 29, 34, 41, 43, 85. Old Lake at Oakland City, May 30, 1937, species: 34; July 12, 1939, species: 15, 22a, 34, 41, 43, 114, 119; Sept. 6, 1937, Sept. 6, 1939, species: 24, 25, 34, 41, 43, 99, 105, 107, 114, 118, 119. Water supply (new) lake at Oakland City, July 12, 1939, species: 15, 22a, 43, 44, 96, 99, 100, 105, 107, 114, 118, 119, 119a; Aug. 16, 1940, Aug. 20, 1938, species: 15, 22a, 25, 41, 43, 72, 99, 105, 107, 115, 118, 119; Sept. 6, 1939, species: 22a, 30, 41, 43, 99, 105, 118, 119. Pools, just east of Oakland City, July 12, 1939, species: 11, 41, 43, 72, 114, 115, 118; Aug. 14, 1937, Aug. 20, 1938, species: 41, 43, 99, 105, 107, 118, 119; Sept. 6, 1937, Sept. 6, 1939, species: 11, 25, 41, 43, 98, 99, 100, 104, 105, 107, 108 (57 ♂ 8 ♀ and 1 ♂ 6 ♀, respectively), 114. Patoka River, below dam of Princeton water supply plant, Aug. 16, 1940, species: 15, 18, 29, 34, 59b—3 ♂, 99; Sept. 6, 1939, species: 15, 18, 29, 41, 82a—2 ♂, 85—1 ♂. Immediately below the dam is a small pool surrounded by sand bars; below this the river has high, bare clay banks.

Greene. Lakes in strip mines near Linton. A lake just south of Linton is located in a pit which has been abandoned for many years and the banks support a considerable growth of vegetation, including blackberries, willows, etc.; July 11, 1939, species: 11, 17, 20, 21, 22a, 41, 43, 87, 107, 115; Aug. 20, 1940, species: 15, 17, 20, 22a, 33, 34, 41, 43, 69, 99, 107. Lakes southwest of Linton are located in pits more recently abandoned and the banks support only scanty herbaceous vegetation, although there is a rather extensive area of cattails at one end of one of the pits; Aug. 22, 1940, species: 15, 17, 22, 22a, 25, 34, 41, 43, 44, 69, 72, 99, 104, 115, 118, 121. A dredged ditch led from one of the latter lakes; at the time of the visits the water was 12-30 inches deep, but had no current. Collecting was done along this stream through a pastured meadow and into the edge of a wooded area; Aug. 22-24, 1940, species: 4, 15, 17, 20, 22, 22a, 25, 41, 43, 72, 99, 100, 104, 107, 114, 115, 119, 121.

Hamilton. White River at Riverwood Dam, Aug. 24, 1939, (LR, MBM & BEM), species: 4, 15, 16; ripples about four miles above Noblesville, Aug. 24, 1939, (LR, MBM & BEM), species: 3, 15, 16, 29, 43, 52.

Huntington. Bog near Monument City, July 28, 1938, species: 45—1 ♂, 108—1 ♀.

Jackson. Pool formed by a dam in a small stream, forest nursery near Vallonia, June 13, 1938, species: 3, 20, 25, 34, 43, 99, 100, 115, 124.

Jasper. Much collecting in this county was done along ditches dug along roads or drainage ditches where crossed by roads; one mile north of Aix, June 26, 1940, species: 43, 66, 100, 117; nine miles north of Aix, June 26, 1940, species: 37a; eleven miles west of Monon, June 25, 1940, species: 21, 58, 100, 104. Wheat field, five miles north of Rensselaer, June 26, 1940, species: 49—teneral ♂. Carpenter Creek and adjacent marshy area in pasture, three miles northwest of Remington, June 25, 1940, species: 13, 16, 20, 29, 37; same creek flowing through a pasture, one mile northwest of Remington, July 10, 1940, species: 3, 4, 15, 16, 18, 20, 21, 29, 43.

Lagrange. Lake and wood lot, north of Lagrange, July 23, 1938, species: 79, 83, 112. Pigeon River, west of Howe, July 23, 1940, species: 16, 17, 29, 68, 75, 111, 112.

Laporte. Lake, two miles east of Laporte, July 22, 1938, species: 3, 7, 11, 13, 112. Pine Plantation, five miles north of Laporte, July 22, 1938, species: 105. Large pool in excavation (made in securing dirt for road building; with herbaceous vegetation and small shrubs just becoming well established on banks) and nearby pools in roadside ditches, July 2, 1940, species: 11, 13, 21, 22, 28, 29, 31, 43, 100, 111, 117, 118.

Marion. Riverside Fish Hatchery, Aug. 12, 1939 (LR, MBM & BEM), species: 17, 21, 22a, 25, 30, 34, 41, 43, 99, 105, 107, 114, 115, 118, 119, 124.

Marshall. Twin Lake, June 18, 1937 (AWT), species: 37—1 ♂.

Monroe. Morgan-Monroe State Forest, along roads near lakes and streams, July 14-15, 1937, species: 15, 20, 22a, 43.

Montgomery. Offield Creek, eight miles south of Crawfordsville, July 11, 1939, species: 3, 18, 20, 29.

Newton. Ditches near Kentland, June 17, 1939, species: 20, 21, 43, 99, 100; stream three miles east of Lake Village, June 26, 1940, species: 7, 20, 37a, 43, 72. Pools of stagnant water in cattail choked drainage ditch, June 27, 1940, species: 7, 13, 112. Iroquois River, near Kentland, June 26, 1940, (near dusk), species: 11, 13, 15, 18, 29, 43, 112.

Noble. Elkhart River, south of Albion, July 25, 1938, (AWT & BEM), species: 3, 4, 13, 17, 20, 29, 99, 112. Skinner Lake, July 25, 1938, (AWT & BEM), species: 11, 20, 21, 29, 33, 34, 35, 41, 43, 105. Collecting was confined to a short stretch of shore, partly bare and partly covered with dense herbage in the deep shade of trees.

Owen. Mill Creek near State Road 43—a large stream with clay banks, shaded at this point—Aug. 30, 1939, species: 4, 15, 43, 70.

Parke. Pond, one mile north of Rockville, June 19, 1940, 5:30-6:30 p. m., (JJF & BEM), species: 21, 29, 34, 43, 66, 87, 99; July 6, 1940, 4:00-4:45 p. m., species: 15, 21, 25, 29, 43, 66, 87, 99, 100, 104, 105, 107. Zygoptera were common on the earlier date, but rather rare on July 6; *Gomphus villosipes* was slightly more numerous in June than in July, but the libellulines were moderately rare in June and abundant in July.

Pike. Pools and fields in strip mine areas near Winslow, Aug. 14, 1937, species: 13, 22a, 72; Aug. 20, 1938, species: 121—11 ♂ 8 ♀

(this species was present in swarms, "hawking" over fields; specimens taken were all slightly teneral).

Pulaski. Small pools, surrounded by dense growth of sedges and grass, on either side of railroad, four miles south of Winamac, July 1 and 3, 1940, species: 7, 11, 13, 25, 43, 100, 104, 108—1 ♂ 1 ♀ (very teneral), 109 (pair flying tandem—♀ ovipositing), 112.

Ripley. Pond, with extensive beds of cattails, Batesville city park, Aug. 12, 1939, (LR & MBM), species: 20, 43, 99, 105, 115.

Rush. Flat Rock River at Rushville, Oct. 6, 1940, a few males of *H. americana* were the only Odonata seen.

Starke. Bass Lake, south shore—sand with growth of sedges, etc., July 2-3, 1940, late afternoon and early morning, cool and strong wind, species: 11, 21, 24, 25, 29, 43; Aug. 27, 1939, species: 41, 43, 111, 114. Robbins Ditch, six miles north of Knox, a large dredged ditch, banks well covered with herbaceous plants, July 1, 1940, species: 1, 3, 4, 29, 43, 58, 99, 104.

Steuben. Lake James in Pokagon State Park, July 7, 1940, (VAK), species: 16, 21, 24, 31, 43, 49—1 ♂ 1 ♀; July 25, 1938, species: 24; Aug. 17, 1937, (AWT), species: 114.

St. Joseph. Studebaker Proving Grounds, open field far from any water, Aug. 5, 1937 (AWT & BEM), species: 114—1 ♂ 2 ♀.

Sullivan. Sullivan-Greene State Forest, grass covered area near pools in old strip mine field, Aug. 19, 1938, species: 15, 17, 20, 22, 22a, 25, 99. In growth of cattails at edge of lake in Shakamak State Park, July 7, 1938, species: 20, 22, 44, 96, 99, 107, 115.

Tippecanoe. Hadley's Lake, Sept. 23, 1940, (BEH, RPM & BEM), species: 43, 110—2 ♂, 111—5 ♂, 112—20 ♂ 2 ♀; the water level was very low, and there were extensive areas of mud flats around the lake. Lafayette park, Aug. 1, 1939, species: 118, 122. Wabash River, five miles south of Lafayette, July 27, 1940, species: 55a—1 ♀, 59b—1 ♂. West shore of Wabash River, north of Lafayette, Sept. 2, 1939, species: 4, 5, 15, 16, 29, 43; Sept. 3, 1940, species: 4, 25, 29, 34, 43, 59b—♀; dragonflies, even *H. americana* were much more abundant in 1939 than in 1940; however, several gomphines were noted in 1940 and none in 1939. Pool in pasture along State Road 53 near White County, Aug 4, 1939, species: 13, 43, 100, 104. Cultivated fields and pasture along Little Pine Creek, June 23, 1939, following heavy rains, creek full of muddy water, species: 3, 15, 20, 21, 29, 104, 105, 107.

Union. Hannah Creek, just east of Liberty, Aug. 24, 1939, (LR, MBM & BEM), species: 3, 4, 17, 43, 70; Oct. 6, 1940, species: 5a—1 ♀, (no other Odonata seen). This is a rock-bottom creek with heavy growth of sedges, shrubs and trees on the bank; in August, 1939, the water was two to six inches deep with noticeable current, in 1940, most of the creek bed was dry with occasional pools of water.

Vanderburgh. Small drainage ditch, with only pools of water, near Stacer, July 13, 1939, species: 20, 41, 43, 100, 104.

Vigo. Pond at Pimento, Aug. 21, 1940, species: 11, 15, 20, 21, 22, 25, 43, 44, 99, 100, 104, 105, 115, 118. Pond, four miles south of Pimento, Aug. 21, 1940, species: 11, 15, 43, 99, 105. Odonate life was much less abundant both in individuals and species at the latter pond, although at many times in the past it has been found to have an abundance of dragonflies.

Warren. Wabash River, opposite Covington, June 20-21, 1940, (5:00-6:00 p.m., each day), species: 15, 29, 52a—22 ♂ 26 ♀, 55a—2 ♂ 2 ♀, 59a—1 ♀, 59b—8 ♂ 7 ♂ (all very teneral), 64—15 ♂ 6 ♀; July 6, 1940, (12:30-1:00 p.m.), species: 52a—1 ♀, 55a—2 ♂ 1 ♀, 59b—1 ♀ (teneral), 112—1 ♂. Collecting was done in a grove of trees with a dense undergrowth of weeds and grass in which there were, however, several roads, paths and trampled areas, on the bank high above the water. *G. amnicola* has always been considered a rare species, except by Wilson (1909) whose references to its abundance have been questioned by other students of the Odonata. However, no other collector since Walsh appears to have spent much time along the larger streams of the upper Mississippi system and it appears probable that collecting along these rivers at the proper season might yield large numbers of several of the so-called rare species of Gomphus.

Warwick. Water supply lake, Booneville, May 30, 1937, species: 22a, 34, 43, 55, 104, 107, 118. Ohio River, several places near Newburgh, July 13, 1939, in extensive collecting the only species found was *A. apicalis* which seemed to be present everywhere along the river and was quite abundant on the bare ground and the iron and concrete structural works of a navigation dam.

Wayne. Elkhorn Creek, a rock bottom creek, several miles south of Richmond, Oct. 6, 1940, species: 4, 70, 114.

Wells. Vanemon Swamp, July 11, 1940 (5:00-6:00 p.m.), species: 7—1 ♂, 8—1 ♂, 9—68 ♂ 11 ♀, 11—8 ♂ 24 ♀, 12—29 ♂ 7 ♀, 13—5 ♂, 43, 112, 115, 117.

White. A number of streams crossed by State Road 53, most of them dredged ditches flowing through pastures, were visited in 1939; however, the banks of these streams were covered with herbaceous plant growth and the stream beds had not been trampled or disturbed in most places; Little Monon Creek (also called Hoagland Ditch), June 17 and 23, species: 1, 3, 18, 20, 21, 27, 29, 41, 43, 58, 93, 100, 107, 117; Aug. 4, species: 3, 4, 13, 15, 16, 17, 18, 20, 21, 29, 43, 70, 99, 100, 121; Big Creek, June 17 and 23, species: 3, 20, 21, 22a, 27, 43, 104, 117; Big Pine Creek, June 23, species: 20, 21, 22a, 58, 100. Lake Freeman near Monticello, June 22 and July 20, 1938, species: 112; near Oakdale Dam, Sept. 15, 1940 (LR, BEH & BEM), species: 22a, 25, 29, 34, 43.

List of Species Recorded From Indiana, With Notes on 1937-1940 Collections

1. *Calopteryx aequabilis* Say. *Starke, *White.
2. *C. angustipennis* (Selys).

3. *C. maculata* (Beauvois). Allen, *Carroll, Elkhart, Fountain, Fulton, *Hamilton, Jackson, Jasper, Laporte, Montgomery, Noble, Posey, *Starke, Tippecanoe, Union, *White.

4. *Hetaerina americana* (Fabricius). *Carroll, *Greene, Hamilton, Jasper, Noble, *Owen, Rush, *Starke, Tippecanoe, Union, Wayne, White.

5. *H. titia* (Drury). *Carroll, *Clay, Tippecanoe.

*5a. **Archilestes grandis* (Rambur). *Union. Since this species was found at Oxford, Ohio, September 25, 1927, by the late E. B. Williamson, and in the vicinity of Dayton a year or two later by Charles W. Cotterman (Williamson, Cotterman, 1931, repeated attempts have been made to find it in the adjacent parts of Indiana. However, no Indiana record for it was obtained until October 6, 1940, when one female was captured along Hannah Creek, about one mile east of Liberty, and about 12 miles northwest of Oxford. This was the only dragonfly seen during a thorough search of about one-half mile of the creek in the early afternoon; it was captured as it alighted on a reed. Two males of the species were taken at Oxford earlier in the day. They were found along a rocky creek bed with only occasional pools of water in a shaded ravine. Before their capture they were noted to fly over these pools of water, "hawking" in the manner of aeshnines.

6. *Lestes congener* Hagen.

7. *L. disjunctus* Selys. Laporte, Newton, Pulaski, Wells. In the past *L. disjunctus* and *L. forcipatus* have been rather badly confused and previously published records of these species for Indiana (and elsewhere) should be disregarded. Mrs. L. K. Gloyd and the author have re-examined all specimens of these species in the Williamson Collection and in their own collections during the last few years and it is expected that additional material will be studied and that notes on the distribution of these species can be published soon. The criteria which have been used for separating these species in the past, the presence (*disjunctus*) or absence (*forcipatus*) of a sooty black stripe on the metapleural suture and the relative length of the basal tooth of the superior appendage in comparison with the apical tooth (longer in *forcipatus*, equal or shorter in *disjunctus*), appear to be of no value. Mrs. Gloyd and the author have developed the following keys for distinguishing the two species; identification of the females is definite and rather easy, that of the males is more difficult and sometimes can be accomplished only by a study of the structure of the penes.

Males:

Distance from the base of the basal tooth of the superior appendages to the base of the apical one equal to or less than the distance from the base of the latter to the tip of the appendage; width across top of V-shaped incision in caudal margin of segment 10 one-third or less of the width of the segment if abdomen has not been crushed or distorted; greatest width of shield-shaped cavity in ventral surface of vesicle near center or in apical (caudal) half; sides of apical portion of penis sub-parallel in ventral view, apical margin straight or concave *disjunctus*

Distance from the base of the basal tooth of the superior appendages to the base of the apical one greater than the distance from the latter to the tip of the appendage; width across top of V-shaped incision in margin of segment 10 more than one-third of the width of the segment if abdomen is not distorted; greatest

width of the shield-shaped cavity in the ventral surface of the vesicle near base (cephalic end); apical portion of penis distinctly pear-shaped in ventral view, apical margin convex.....*forcipatus*

Females:

Ovipositor not extending beyond the tip of the abdomen; rear of head dark *disjunctus*

Ovipositor extending beyond the tip of the abdomen; rear of head light *forcipatus*

8. *L. eurinus* Say. Wells.

9. *L. forcipatus* Rambur. Wells. Although *forcipatus* appears to be much less common and more local in distribution than *disjunctus* it is well established at Vanemon Swamp as may be seen from the 1940 collection which contained 68 ♂ ♂ and 11 ♀ ♀ of *forcipatus* and only one ♂ of *disjunctus*. A long series of *forcipatus* was secured here on July 4, 1926, also.

10. *L. inaequalis* Walsh.

11. *L. rectangularis* Say. *Carroll, Gibson, *Greene, *Laporte, *Newton, Noble, *Pulaski, *Starke, Vigo, Wells.

12. *L. dryas* Kirby. Wells. This species has long been known as *uncatus* in this country; although many authorities recognized the specific identity of the American and the Old World forms and Schmidt called attention to this identity in 1930, authors continued to use both names until Cowley suppressed the name *uncatus* in 1935 after a careful study of numerous specimens from both continents.

13. *L. unguiculatus* Hagen. *Jasper, *Laporte, *Newton, Noble, *Pike, *Pulaski, *Tippecanoe, Wells, *White.

14. *L. vigilax* Hagen.

15. *Argia apicalis* (Say). Carroll, Clark, Elkhart, Gibson, *Greene, Hamilton, *Jasper, *Monroe, *Newton, *Owen, Parke, Sullivan, Tippecanoe, Vigo, Warren, *Warrick, White.

16. *A. moesta* (Hagen). *Carroll, Elkhart, Hamilton, *Jasper, Lagrange, Steuben, Tippecanoe, *White.

17. *A. sedula* (Hagen). Boone, *Carroll, *Clark, *Greene, Lagrange, *Marion, Noble, *Sullivan, Union, White.

18. *A. tibialis* (Rambur). *Elkhart, Gibson, *Jasper, *Montgomery, *Newton, Tippecanoe, White.

19. *A. translata* Hagen.

20. *A. violacea* (Hagen). Boone, Clark, *Fountain, Greene, *Jackson, Jasper, Monroe, *Montgomery, Newton, Noble, *Ripley, *Sullivan, Tippecanoe, *Vanderburgh, Vigo, White.

21. *Enallagma antennatum* (Say). Boone, *Clark, *Greene, Jasper, *Laporte, Marion, Newton, Noble, Parke, *Starke, Steuben, Tippecanoe, Vigo, *White.

22. *E. aspersum* (Hagen). Clark, *Greene, *Laporte, *Sullivan, *Vigo.

22a. *E. basidens* Calvert. (Montgomery, 1932). *Boone, *Carroll, *Clark, *Clay, Gibson, Greene, *Marion, *Monroe, *Pike, *Sullivan, Warrick. The specimens from Clark County (Francke Lake) are considerable larger than usual for this species. Measurements of a male from this

series were: length 27.5 mm., abdomen 22 mm., rear wing 14.5 mm.; of a female: length 26.5 mm., abdomen 21 mm., rear wing 15 mm. Specimens from the Green County Collection were found to have the following measurements: ♂, length 23 mm., abdomen 18 mm., rear wing 11 mm.; ♀, length 23.5 mm., abdomen 18.5 mm., rear wing 12 mm.

23. *E. boreale* Selys.
24. *E. carunculatum* Morse. Carroll, Gibson, *Starke, Steuben.
25. *E. civile* (Hagen). Carroll, Clark, *Fountain, *Franklin, Gibson, Greene, *Jackson, Marion, *Morgan, Parke, *Pulaski, *Starke, *Sullivan, Tippecanoe, Vigo, White.
26. *E. cyathigerum* (Charpentier).
27. *E. divagans* Selys. White.
28. *E. ebrium* (Hagen). *Laporte.
29. *E. exsulans* (Hagen). Boone, Carroll, Elkhart, *Franklin, Gibson, Hamilton, Jasper, Lagrange, *Laporte, Montgomery, Newton, Noble, *Parke, *Starke, Tippecanoe, *Warren, White. A female of this species was taken from a spider web along Little Monon Creek on Aug. 4, 1939. When discovered it was as still as if dead, but when an attempt was made to secure it the web was broken and the dragonfly tried to flutter away. However, it could not fly and when captured was found to have the body completely severed near the caudal margin of the fourth abdominal segment except for a very thin strip of the venter.
30. *E. geminatum* Kellicott. Gibson, Marion.
31. *E. hageni* (Walsh). *Laporte, Steuben.
32. *E. piscinarium* Williamson.
33. *E. vesperum* Calvert. *Clark, *Greene, Noble. The specimens from Francke Lake and the lake near Linton were collected from above the water at dusk, but those at Skinner Lake were taken from shaded vegetation in mid-afternoon.
34. *E. signatum* (Hagen). Carroll, *Clark, *Clay, Gibson, *Greene, *Jackson, *Marion, Noble, *Parke, *Tippecanoe, Warrick, White.
35. *E. travium* Selys.
36. *Nehalennia gracilis* Morse.
37. *N. irene* Hagen. Elkhart, *Jasper, Marshall.
- 37a. *Amphiagrion abbreviatum* (Selys). (Montgomery, 1937). *Fountain, Jasper, *Newton.
38. *A. saucium* (Burmeister).
39. *Chromagrion conditum* (Hagen).
40. *Ischnura kellicotti* Williamson.
41. *I. posita* (Hagen). *Carroll, Clark, Clay, Gibson, *Greene, Marion, Noble, *Starke, Vanderburgh, White.
42. *I. prognata* (Hagen).
43. *I. verticalis* (Say). Adams, Boone, Carroll, Clark, Clay, Fountain, Gibson, Greene, Hamilton, Jackson, Jasper, *Laporte, *Marion, Noble, *Newton, *Owen, Parke, Pulaski, *Ripley, *Starke, Steuben, Tippecanoe, Union, Vanderburgh, Vigo, Warrick, Wells, White. Flower heads of milkweed and over plants, abundant along Little Monon Creek on Aug. 4, 1939, attracted many Hymenoptera and Diptera, especially a small black fly which had clustered on some flowers until they were

almost covered. Dragonflies, especially *I. verticalis*, were noted to hover near these flowers, as if hunting for prey. A female *verticalis* was watched as it flew about the umbels of a milkweed until it caught one of the small flies. It flew directly at the fly, seized it with its feet, then started flying directly backwards (reversing its motion completely without turning its body at all). Both dragonfly and fly were captured and the latter was determined by C. T. Greene as *Empis clausa* Coq.

44. *Anomalagrion hastatum* (Say). Clark, Gibson, *Sullivan, Vigo.

45. *Tachopteryx thoreyi* (Hagen). Huntington.

46. *Cordulegaster diastatops* (Selys).

47. *C. maculatus* Selys.

48. *C. obliquus* (Say). Clark.

49. *Progomphus obscurus* (Rambur). Jasper, Steuben.

50. *Hagenius brevistylus* Selys.

51. *Ophiogomphus rupinsulensis* (Walsh).

52. *Erpetogomphus designatus* Hagen. *Carroll, Hamilton.

52a. *Gomphus amnicola* Walsh. (Montgomery, 1925). *Warren.

Many of the specimens obtained on June 20 and 21 were somewhat teneral and all of them were comparatively freshly emerged, but the female taken on July 6 appeared quite old. The color pattern is much clearer in younger specimens.

52b. *G. cornutus* Tough. (Montgomery, 1934).

53. *G. crassus* Hagen.

54. *G. lineatifrons* Calvert.

55. *G. exilis* Selys. *Warrick.

55a. *G. externus* Hagen. (Montgomery, 1930). *Tippecanoe, *Warren.

56. *G. fraternus* (Say).

57. *G. furcifer* Hagen.

58. *G. graslinellus* Walsh. Allen, *Jasper, *Starke, *White.

58a. *G. laurae* (Williamson). (Williamson, 1932.)

59. *G. lividus* Selys.

59a. *G. notatus* Rambur. (Montgomery, 1925). *Warren.

59b. *G. plagiatus* Selys. (Montgomery, 1925). Gibson, *Tippecanoe, *Warren. The specimens from the Wabash River in Warren County were taken at very early dates for this species (June 20 and 21 and July 6). However, all of them were very teneral.

60. *G. quadricolor* Walsh. Elkhart.

61. *G. spicatus* Hagen.

62. *G. spiniceps* (Walsh). *Carroll.

62a. *G. subapicalis* Williamson. (Montgomery, 1934.)

63. *G. submedianus* Williamson. Gibson.

64. *G. vastus* Walsh. Elkhart, *Warren.

65. *G. ventricosus* Walsh.

66. *G. villosipes* Selys. Jasper, Parke. This species was rather common at the Parke County pond on both dates (June 19 and July 6) although much more numerous on the earlier date. Females were ovipositing by tapping the abdomen against the algal mat on the surface of the water near the shore. Males as well as females frequently

alighted on this mat. There were also algal mats on the water at the Jasper County locality.

- 66a. *G. viridifrons* Hine. (Williamson, 1920.)
67. *G. williamsoni* Muttkowski.
68. *Dromogomphus spinosus* Selys. *Carroll, Lagrange.
69. *D. spoliatus* (Hagen). *Clark, Gibson, *Greene.
70. *Boyeria vinosa* (Say). *Carroll, Wayne, *White.
71. *Basiaeschna janata* (Say).
72. *Anax junius* (Drury). Fountain, Gibson, *Greene, *Newton, *Pike.
- 72a. *A. longipes* Hagen. (Montgomery, 1937.)
73. *Aeshna canadensis* Walker.
74. *A. clepsydra* Say.
75. *A. constricta* Say. Lagrange.
76. *A. mutata* Hagen.
77. *A. tuberculifera* Walker.
78. *A. umbrosa* Walker. Cass.
79. *A. verticalis* Hagen. Lagrange.
80. *Nasiaeschna pentacantha* (Rambur). Gibson.
81. *Epiaeschna heros* (Fabricius).
82. *Didymops transversa* (Say). *Clark.
- *82a. **Macromia georgina* (Selys). *Gibson. The addition of this species to the state list is based upon two males collected along the Patoka River, September 6, 1939, and two males collected at Foote's Lake, July 18, 1931. These four specimens agree rather well with Williamson's description of the species (1908), except that two of them have the antehumeral stripe shorter than described. However, a careful study of the North American species of this genus is much needed and final classification of individual specimens, especially in the *illinoiensis-georgina* group, must await such monographic work. *Georgina* has been recorded previously from North and South Carolina, Florida, Georgia and Texas, and *australensis*, which Walker has considered as a synonym, from Maryland, Alabama, Oklahoma and Texas.
83. *M. illinoiensis* Walsh. Lagrange.
84. *M. pacifica* Hagen.
85. *M. taeniolata* Rambur. *Clark, Gibson.
86. *M. wabashensis* Williamson.
87. *Epicordulia princeps* (Hagen). Carroll, Clark, *Parke.
88. *Neurocordulia obsoleta* (Say).
89. *Tetragoneuria cynosura* (Say). Clark.
90. *T. cynosura simulans* Muttkowski. *Clark.
91. *T. spinigera* Selys.
92. *Dorocordulia libera* (Selys).
93. *Somatochlora ensigera* Martin. *White. The two specimens from Little Monon Creek are quite teneral, indicating that they had probably emerged only recently and had spent their immature life in this creek. This creek in open prairie is a very different habitat from the woodland streams from which this species has been previously collected.
94. *S. linearis* (Hagen). Clark, *Morgan.

95. *S. tenebrosa* (Say).
96. *Libellula cyanea* Fabricius. *Carroll, Clark, *Clay, Gibson, *Sullivan.
97. *L. julia* Uhler.
98. *L. incesta* Hagen. Gibson.
99. *L. luctuosa* Burmeister. Carroll, Clark, *Clay, *Fountain, Gibson, Greene, *Jackson, Marion, Noble, Parke, *Ripley, *Starke, *Sullivan, Vigo, White.
100. *L. pulchella* Drury. Clark, *Fountain, Gibson, Greene, *Jackson, Jasper, *Laporte, Pulaski, Vanderburgh, Vigo, *White.
101. *L. quadrimaculata* Linné.
102. *L. semifasciata* Burmeister.
103. *L. vibrans* Fabricius. *Gibson.
104. *Plathemis lydia* (Drury). Allen, Carroll, Clark, Fountain, Gibson, Greene, Jasper, Parke, Pulaski, *Starke, Vanderburgh, Vigo, *Warrick, *White.
105. *Perithemis tenera* (Say). Clark, Clay, Gibson, *Laporte, *Marion, Noble, Parke, *Ripley, Vigo.
106. *Nannothemis bella* (Uhler).
- 106a. *Erythrodiplax minuscule* (Rambur). (Montgomery, 1930.)
- 106b. *E. umbrata* (Linné). (Montgomery, 1935.)
107. *Erythemis simplicicollis* (Say). Carroll, Clark, *Fountain, Gibson, Greene, Marion, *Sullivan, Tippecanoe, Warrick, White.
108. *Sympetrum ambiguum* (Rambur). Gibson, *Huntington, *Pulaski.
109. *S. corruptum* (Hagen). *Pulaski.
110. *S. decisum* (Hagen). *Tippecanoe.
111. *S. obtrusum* (Hagen). Lagrange, *Laporte, *Starke, Tippecanoe.
112. *S. rubicundulum* (Say). Allen, Fayette, Lagrange, *Laporte, *Newton, Noble, *Pulaski, Tippecanoe, *Warren, Wells, White. Several of the specimens from the 1940 collections show tendencies towards the clouded wing form which is regarded as a separate species, *assimulatum*, by some authorities. The two females from the Iroquois River (Newton Co.) have the wings distinctly colored; in one this is quite marked to the nodus, especially along the costa, in the other it is rather faint beyond the second or third antenodal cross vein, although there is a faint tinge to the nodus. Three specimens (2 ♂ 1 ♀) from Hadley's Lake (Tippecanoe Co.) have the wings colored to the nodus and three others (2 ♂ 1 ♀) have the wings distinctly colored to the level of the triangles and tinged to the nodus. Of the three mated pairs taken here, neither male or female of one had clouded wings, one male with wings clouded to the nodus was mated to a female with partly colored wings, and the female with the wings colored to the nodus was mated to a male with uncolored wings.
113. *S. semicinctum* (Say).
114. *S. vicinum* (Hagen). *Allen, *Clark, Gibson, Greene, *Marion, *Starke, Steuben, St. Joseph, *Wayne.

115. *Pachydiplax longipennis* (Burmeister). Carroll, Clark, Gibson, *Greene, *Jackson, Marion, *Ripley, *Sullivan, Vigo, Wells. A female captured at Francke Lake, June 16, 1938, was held by the wings until a mass of eggs extruded, then dipped to the water. The mass of eggs sank three or four inches, then separated. The process was repeated several times; the egg mass almost always divided, but only once or twice was this violent enough to be called an "explosion." Even in these cases the masses always sank deeper and dissolved with less violence than the explosion of the egg masses of *Perithemis tenera* which has been described elsewhere. Usually the mass merely fell apart.

116. *Leucorrhinia frigida* Hagen.

117. *L. intacta* (Hagen). *Clay, *Jasper, *Laporte, Wells, *White.

118. *Celithemis elisa* (Hagen). Clark, Gibson, *Greene, *Laporte, *Marion, Tippecanoe, *Vigo, Warrick.

119. *C. eponina* (Drury). Gibson, *Greene, *Marion, *Ripley.

119a. *C. fasciata* Kirby. (Montgomery, 1937.) Gibson. Although only one specimen was taken a number were seen, showing that this species has become established at the Oakland City lake where one specimen was obtained in 1936. The specimen (δ) obtained agrees with the characters of *fasciata* except for the pale basal enclosed area.

120. *C. monomelaena* Williamson.

121. *Pantala flavescens* (Fabricius). *Greene, *Pike.

122. *P. hymenaea* (Say). *Tippecanoe.

123. *Tramea carolina* (Linné).

124. *T. lacerata* Hagen. Clark, *Jackson, Marion.

125. *T. onusta* Hagen.

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